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S4	208	(707/103y).cccls.	US-PGPUB; USPAT	OR	OFF	2006/10/10 07:34
S5	49	("20050044102" "6374263" "6480836" "6493699" "6594653" "20010013030" "20020077997" "6493708" "6775681" "6775682" "6965891" "6694324" "5848408" "5991754" "6353828" "5778240" "5937408" "5970493" "6073134" "6108657" "6223182" "6223182" "6345272" "6374235" "6397214" "6424967" "6446063" "6484179" "6609131" "6636870" "6665684" "6711563" "6735590" "6778996" "6847973" "7020661" "7035843" "7076502" "20020038306" "20020095397" "20020095421" "20020194157" "20030055832" "20030208503" "20040006574" "20040034616" "20040054683" "20050004936" "20050010579" "20050246357").pn.	US-PGPUB; USPAT	OR	OFF	2006/10/10 08:40
S6	6	(data with (densify or densification)) and join	US-PGPUB; USPAT	OR	OFF	2006/10/10 08:42
S7	314	(outer or outter) adj join	US-PGPUB; USPAT	OR	OFF	2006/10/10 08:43
S8	243	S7 and @ad<"20030822"	US-PGPUB; USPAT	OR	OFF	2006/10/10 08:44
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Abhinav Gupta, Sankar Subramanian, Srikanth Bellamkonda, Tolga Bozkaya, Nathan Folkert, Lei Sheng, Andrew Witkowski

 June 2004 **Proceedings of the 2004 ACM SIGMOD international conference on Management of data**

Publisher: ACM Press

 Full text available: [pdf\(227.07 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

Data in a relational data warehouse is usually sparse. That is, if no value exists for a given combination of dimension values, no row exists in the fact table. Densities of 0.1-2% are very common. However, users may want to view the data in a dense form, with rows for all combination of dimension values displayed even when no fact data exists for them. For example, if a product did not sell during a particular time period, users may still want to see the product for that time period with zero s ...

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Andrew Witkowski, Srikanth Bellamkonda, Tolga Bozkaya, Nathan Folkert, Abhinav Gupta, John Haydu, Lei Sheng, Sankar Subramanian

 March 2005 **ACM Transactions on Database Systems (TODS)**, Volume 30 Issue 1

Publisher: ACM Press

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Commercial relational database systems lack support for complex business modeling. ANSI SQL cannot treat relations as multidimensional arrays and define multiple, interrelated formulas over them, operations which are needed for business modeling. Relational OLAP (ROLAP) applications have to perform such tasks using joins, SQL Window Functions, complex CASE expressions, and the GROUP BY operator simulating the pivot operation. The designated place in SQL for calculations is the SELECT clause, whi ...

Keywords: Excel, OLAP, analytic computations, spreadsheet

3 [Online analytic processing \(OLAP\): Spreadsheets in RDBMS for OLAP](#)



Andrew Witkowski, Srikanth Bellamkonda, Tolga Bozkaya, Gregory Dorman, Nathan Folkert, Abhinav Gupta, Lei Shen, Sankar Subramanian

 June 2003 **Proceedings of the 2003 ACM SIGMOD international conference on Management of data**



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Abhinav Gupta, Sankar Subramanian, Srikanth Bellamkonda, Tolga Bozkaya, Nathan Folkert, Lei Sheng, Andrew Witkowski
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2 [Maintenance of data cubes and summary tables in a warehouse](#)



Inderpal Singh Mumick, Dallan Quass, Barinderpal Singh Mumick
 June 1997 **ACM SIGMOD Record , Proceedings of the 1997 ACM SIGMOD international conference on Management of data SIGMOD '97**, Volume 26 Issue 2

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Data warehouses contain large amounts of information, often collected from a variety of independent sources. Decision-support functions in a warehouse, such as on-line analytical processing (OLAP), involve hundreds of complex aggregate queries over large volumes of data. It is not feasible to compute these queries by scanning the data sets each time. Warehouse applications therefore build a large number of summary tables, or materialized aggregate views, to ...

3 [Industrial session: query processing and optimization: Query by Excel](#)

Andrew Witkowski, Srikanth Bellamkonda, Tolga Bozkaya, Aman Naimat, Lei Sheng, Sankar Subramanian, Allison Waingold
 August 2005 **Proceedings of the 31st international conference on Very large data bases VLDB '05**

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